Short Handbook on Direct Instruction

Arthur Academy Charter Schools
from nifdi.org

Beginnings

The origins of Direct Instruction lie in the genius of Siegfried Engelmann who chose to study the process of learning and instruction from a new vantage point. In the early 1960s, Engelmann worked in advertising, where he began analyzing what type of input was necessary to induce retention. His work on these marketing strategies led him to develop techniques for teaching children, initially his own two sons. These early experiments led to the first Direct Instruction programs and techniques. Engelmann realized the relation between what his sons learned and how he instructed them and applied this knowledge to his work with education researcher Carl Bereiter at the Institute for Research on Exceptional Children in Champaign, Illinois (1964-1966). In 1964, they formed the Bereiter-Engelmann preschool, where they would begin using and testing direct instruction techniques with disadvantaged children. While conducting this research, Engelmann developed the central philosophy of Direct Instruction, which is if a student fails to learn it is not the fault of the student, but rather the instruction.

Throughout the 1960s, Engelmann conducted research on the effectiveness of his instructional techniques and programs in order to better understand how children of different backgrounds and varying skill levels learned. His experiments were designed to understand how to instruct children as efficiently and effectively as possible and how appropriate instruction differs for children of different backgrounds and skills. Engelmann utilized a scientific approach to analyze each variable of instruction to determine the most efficient and effective instructional approach. Through his experiments, Engelmann determined disadvantaged students had a deficit in language skills in comparison to their more affluent peers, which hindered their learning rate. This lack of language skills made the acquisition of reading skills more difficult, so Engelmann began focusing on developing language and reading skills in tandem. This research solidified Engelmann's theory that students' acquisition of knowledge and development of skills is dependent on the teacher's appropriate instruction, which needs to be adjusted based on the child's skill level. A teacher must recognize and understand the students' skills as well as what type of instruction they need to progress and acquire new skills so they become confident and successful students.

Direct Instruction was designed to maximize the effectiveness and efficiency of instruction, while simultaneously recognizing students' skill levels in order for them to receive the appropriate instruction to prevent them from being overwhelmed and falling behind the achievement of their peers. Engelmann determined students must establish mastery of skills in order to progress in their studies and therefore

students should be instructed in small groups based off of skill level opposed to grade level. By establishing mastery, students can more easily progress to more complex areas of studies because they will not need as much review of the fundamentals the new material is based off of. Additionally by establishing mastery students gain confidence in their skills and ability to succeed. Engelmann initially intended Direct Instruction to be used with at-risk students to allow them to learn more in less time so they could attain the same skills of their more affluent peers by the end of elementary school. By catching up with their peers by the end of elementary school, the at-risk students would have the confidence and ability to compete on a level playing field as they progress in school. The success of Direct Instruction is dependent on the proper placement of students into classrooms based on their skill level, the use of appropriate academic curriculum, and adequate instruction from teachers. Engelmann's philosophy of instruction and early research with young children would lead to the development of DISTAR in the 1960s as well as all subsequent Direct Instruction programs.

Basic Philosophy of Direct Instruction (DI)

What is DI?

Direct Instruction (DI) is a model for teaching that emphasizes well-developed and carefully planned lessons designed around small learning increments and clearly defined and prescribed teaching tasks. It is based on the theory that clear instruction eliminating misinterpretations can greatly improve and accelerate learning.

Its creators, Siegfried Engelmann and Dr. Wesley Becker, and their colleagues believe, and have proved, that correctly applied DI can improve academic performance as well as certain affective behaviors. It is currently in use in thousands of schools across the nation as well as in Canada, the UK and Australia. Schools using DI accept a vision that actually delivers many outcomes only promised by other models.

Siegfried Engelmann

Direct Instruction operates on five key philosophical principles:

☑ All children can be taught.

☑ All children can improve academically and in terms of self image.

☑ All teachers can succeed if provided with adequate training and materials.

☑ Low performers and disadvantaged learners must be taught at a faster rate than typically occurs if they are to catch up to their higher-performing peers.

☑ All details of instruction must be controlled to minimize the chance of students' misinterpreting the information being taught and to maximize the reinforcing effect of instruction.

Why does DI work?

There are four main features of DI that ensure students learn faster and more efficiently than any other program or technique available:

Students are placed in instruction at their skill level.
When students begin the program, each student is tested to find out which skills they have already mastered and which ones they need to work on. From this, students are grouped together with other students needing to work on

the same skills. These groups are organized by the level of the program that is appropriate for students, rather than the grade level the students are in.

The program's structure is designed to ensure mastery of the content.
The program is organized so that skills are introduced gradually, giving children a chance to learn those skills and apply them before being required to learn another new set of skills. Only 10% of each lesson is new material. The remaining 90% of each lesson's content is review and application of skills students have already learned but need practice with in order to master. Skills and concepts are taught in isolation and then integrated with other skills into more sophisticated, higher-level applications. All details of instruction are controlled to minimize the chance of students' misinterpreting the information being taught and to maximize the reinforcing effect of instruction.

Instruction is modified to accommodate each student's rate of learning.
A particularly wonderful part about DI is that students are retaught or accelerated at the rate at which they learn. If they need more practice with a specific skill, teachers can provide the additional instruction within the program to ensure students master the skill. Conversely, if a student is easily acquiring the new skills and needs to advance to the next level, students can be moved to a new placement so that they may continue adding to the skills they already possess.

Programs are field tested and revised before publication.
DI programs are very unique in the way they are written and revised before publication. All DI programs are field tested with real students and revised based on those tests before they are ever published. This means that the program your student is receiving has already been proven to work.

The implementation of Direct Instruction and the five key philosophical principles will introduce a crucial element in the school system: change. Teachers will generally be required to behave differently than before and schools may need an entirely different organization than they previously employed. Even staff members will be called upon to alter some operations. The popular valuing of teacher creativity and autonomy as high priorities must give way to a willingness to follow certain carefully prescribed instructional practices. Remaining the same, however, are the importance of hard work, dedication and commitment to students. And, it is crucial that all concerned adopt and internalize the belief that *all students, if properly taught, can learn.*

Focusing on Student Performance

Implementing Direct Instruction (DI) effectively requires teachers and administrators to make student performance the focus of the staff's efforts to improve the school.

Student performance determines:

1) placement in groups,

2) which instructional materials should be ordered, and

3) which levels of the programs teachers should receive training in.

Student performance also determines whether a problem exists. If students are not progressing through the program at mastery at an acceptable rate, then there is a problem. When effective administrators and coaches enter classrooms, they focus on student performance. If there is something unconventional about the classroom setup or the teacher's delivery, but students are learning successfully, then there is no problem. If a teacher's signal is unusual, for instance, but all children respond in unison, then there is no problem because a signal's purpose is to prompt students to respond together. Similarly, if an instructional group is larger than recommended but all students can see the presentation book, respond together, and the teacher is able to monitor all of their responses, then there is no problem because the purpose of smaller groups is to ensure that teachers can monitor the responses of all students.

When administrators and coaches identify problems of student performance, they require accurate, current data on the progress of each instructional group and the performance of each student on in-program assessments. They may also need to get more specific information on the problem:

- During which exercises and on which items does this problem occur?
- How long has the problem been taking place?
- What has been done already to solve the problem?
- What was the effect of implementing these remedies?
- Have any other problems, including behavioral problems, arisen since the identification of the original problem?
- What specific steps can be taken to solve the original problem and any spin-off problems?
- Who is going to take the steps and talk with the teacher about the problem(s)?

This comprehensive approach to problem-solving is critical because problems rarely solve themselves. They usually worsen and cause other problems to occur. So it is important to solve each problem as it occurs and not relent until it is gone!

IMPORTANT: If teachers aren't aware that a problem exists, they can't solve it. If teachers aren't aware that they need assistance, they won't ask for it. Regular in-class observations and

weekly data analysis can uncover student problems and identify areas where teachers need assistance. To be effective in spotting problems, both in-class observations and data analysis require a focus on student performance. With student performance at the center, administrators and coaches can more easily talk about problems with teachers. Focusing on student performance keeps discussions away from "the blame game" of finding fault with staff members and keeps discussion centered on how to help all children succeed.

Introduction to Direct Instruction (script for video on nifdi.org 2015)
http://www.nifdi.org/what-is-di/intro-to-di

What is Direct Instruction?

Direct Instruction (DI) is a teaching methodology that provides students clear instruction at their skill level so they can master content and strategies that allow them to learn at a faster rate than traditional methods.

Direct Instruction was developed by Prof. Siegfried Engelman and colleagues at the University of Illinois in the late 1960s and at the University of Oregon in the 1970s.

Direct Instruction is Explicit
Teachers follow presentation scripts based on a sophisticated communication theory to provide faultless instruction. Instruction ensures that all students master the skills and content in the lessons if the students possess the prerequisite skills and attend to the teacher's presentation.

Students respond orally or in written form. Teachers respond immediately to oral responses, confirming correct responses and correcting errors.

Direct Instruction is Systematic
The DI programs are built on a step by step design. The material presented to students incrementally increases in complexity and sophistication as the students progress through the program. Students are placed into the instructional sequence according to their performance on in-program placement tests. Students are grouped homogenously by skill level for instruction, not by grade level, which allows teachers to target their presentation closely to the student's understanding of a given topic.

Lessons are divided into several separate exercises that focus on different aspects of the subject material. Each exercise is part of a skill building track that focuses on a set of critical skills that go together. These tracks are combined together over time as students master the component skills in the tracks.

Learning is scaffolded

Students receive direct modeling of rules and examples when these are first introduced. Students perform tasks after they have been modeled. Then, as students progress through the instructional sequence, they become more independent. They apply what they've learned to unique situations and they review skills and content periodically to insure that they maintain a high level of mastery of the material covered and can apply it to new contexts.

Students progress through the instructional sequence as dictated by their performance.
Students who master material quickly can progress through the lessons faster, following a fast track or skip schedule. Students who have difficulty with the material will repeat lessons until they are mastered. If students continue on to more advanced lessons without mastering earlier lessons they will have difficulty because all material covered in earlier lessons lay the basis for and is incorporated into later lessons.

So a fundamental step in implementing Direct Instruction successfully is to make sure that all students master all the material they encounter in the lessons each and every day.

SOME CHARACTERISTICS OF DIRECT INSTRUCTION CURRICULUM PROGRAMS

HOW THE FIRST PROGRAMS WERE DEVELOPED

Since 1968, Siegfried Engelmann, and Douglas Carnine have been involved in Project Follow Through, one of the largest federally funded experiments in early education ever conducted. Their model – the Direct Instruction Model – was deemed highly successful in the independent evaluation (Stebbins, St. Pierre, Proper, Anderson, and Cerva, 1977). In reflecting on what led to the success of the Direct Instruction Model in enhancing student achievement, several factors recurrently stand out.

THE TWO MAJOR CONCERNS THAT EMERGED

The first is a concern with instructional design, the *details* of curriculum (Engelmann and Carnine, 1982). This process focuses on what many educators might consider mundane decisions: the best wording for teachers to use in demonstrating a new skill; the most effective way to correct student's errors; the most effective strategy for introducing a concept; and the number and range of examples necessary to insure mastery of a new concept.

The second concern is the close attention to teacher behavior and classroom organization. What is the appropriate pacing for a lesson? How many questions should the teacher ask students during the active teaching phase of the lesson? What is the optimal ratio of guided practice to independent seatwork activities?

A THEORY OF INSTRUCTION

In *Theory of Instruction,* Englemann and Carnine (1982) attempt to provide a more detailed analysis of how to teach concepts and strategies effectively to students. They devote a significant portion of their book to the initial phases of instruction – the place where students are most likely to become confused and misunderstand what is being taught. By controling the number and type of examples presented; by providing detailed, step-by-step instruction fashioned on specific problem solving strategies; and by incorporating strategy-based correction procedures, instruction can be successful for a much wider range of students.

This work has been comprehensively reviewed (e.g., Moore, 1986) and supported by an appreciable amount of empirical research. This work has been seen by some (Brophy and Good, 1986; Tarver, 1986) as a necessary adjunct to the research on effective teaching.

Teaching to Mastery

Mastery is at the core of all Direct Instruction (DI) programs. Each DI program is constructed using a Print small-step design that ensures that all students can be taught to mastery every day if they are placed properly in the program. Only 10-15% of a DI lesson contains new material. The rest of the lesson reviews or applies material taught in previous lessons so students can master the material and perform correctly on every task or exercise by the end of a lesson.

Appropriate placement is critical to teaching children to mastery. If students are placed in material that's too difficult for them, the amount that students have to learn is much greater than 10-15% of a lesson. They cannot master the material in a single day when there is too much that they do not know.

Students should be placed at a lesson where they can perform correctly on every item the first time they see it, at least 70% of the time for new material and 90% correct on the review material and applications that have been taught previously. If students have these first-time correct response rates, by the end of a lesson they will be able to learn the material they didn't get right the first time. Teachers will have enough time to correct errors that students make, and students will be able to absorb the new material presented in each lesson.

Teaching to mastery has several important benefits to students. Students who master material in a lesson can more easily learn new material. The skills and concepts students acquire provide a very strong foundation for learning new skills and concepts. Students' self-esteem increases when they master material presented to them. They are confident that they will be able to learn new material. They know they are successful. They look forward to going to school, participating in groups and doing their assignments.
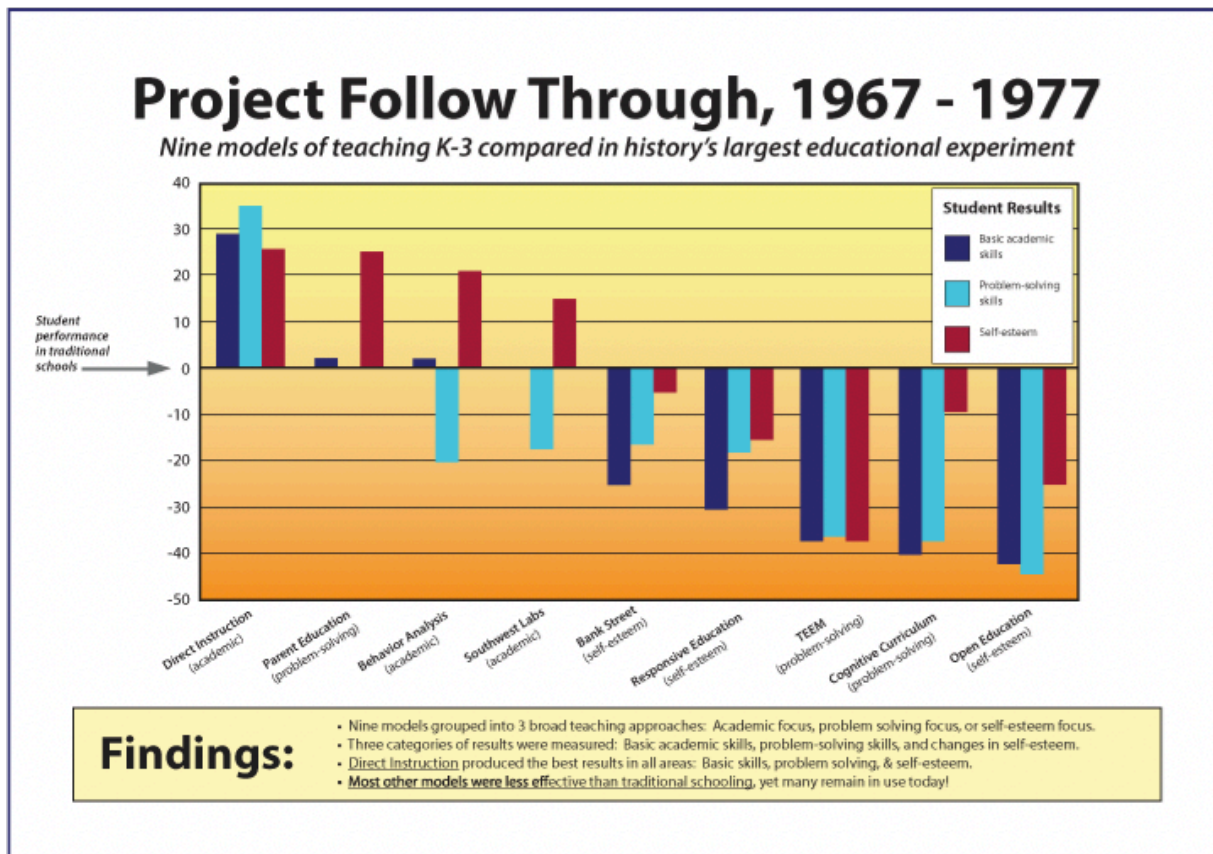
IMPORTANT: Assigning students material they can't understand can be very punishing to them. Forcing a 3rd grade student with beginning decoding skills to read a grade-level text, for example, communicates to the student that s/he can't read nearly as well as many other
3rd graders. The overall message is that the student is deficient, which can lead to serious self-image problems. Students who are put in material that is too difficult for them often generalize from their experience and anticipate that they will fail on any new material they encounter. Conversely, students who are placed in material they can master in a reasonable amount of time develop very positive self-images. They anticipate that they will master any new material they encounter, and they are ready for the challenge!

Project Follow Through

Project Follow Through was the most extensive educational experiment ever conducted. Beginning in Print 1968 under the sponsorship of the federal government, it was charged with determining the best way of teaching at-risk children from kindergarten through grade 3. Over 200,000 children in 178 communities were included in the study, and 22 different models of instruction were compared. The communities that implemented the different approaches spanned the full range of demographic variables (geographic distribution and community size), ethnic composition (white, black, Hispanic, Native American) and poverty level (economically disadvantaged and economically advantaged). Parent groups in participating communities selected one approach that they wanted to have implemented, and each school district agreed to implement the approach the parent group selected.

Follow Through had strong safeguards to assure that the participating districts actually implemented the approach it adopted. The government provided stipends to supplement local budgets and support the implementations and also provided comprehensive health services, including a nutritional component, plus medical-dental care.

Evaluation of the project occurred in 1977, nine years after the project began. The results were strong and clear. Students who received Direct Instruction had significantly higher academic achievement than students in any of the

Project Follow Through, 1967 - 1977
Nine models of teaching K-3 compared in history's largest educational experiment

Student Results
- Basic academic skills
- Problem-solving skills
- Self-esteem

Student performance in traditional schools →

Models (x-axis): Direct Instruction (academic), Parent Education (problem-solving), Behavior Analysis (academic), Southwest Labs (academic), Bank Street (self-esteem), Responsive Education (self-esteem), TEEM (problem-solving), Cognitive Curriculum (problem-solving), Open Education (self-esteem)

Findings:
- Nine models grouped into 3 broad teaching approaches: Academic focus, problem solving focus, or self-esteem focus.
- Three categories of results were measured: Basic academic skills, problem-solving skills, and changes in self-esteem.
- Direct Instruction produced the best results in all areas: Basic skills, problem solving, & self-esteem.
- Most other models were less effective than traditional schooling, yet many remain in use today!

other programs. They also had higher self esteem and self-confidence. No other program had results that approached the positive impact of Direct Instruction. Subsequent research found that the DI students continued to outperform their peers and were more likely to finish high school and pursue higher education.

Follow the links below to get additional information on Project Follow Through, including its design, the findings, and what happened with the results:

Athabasca University online module on Direct Instruction Evidence: Project Follow Through.
Siegfried Engelmann describes the Follow Through experiment, the results and the aftermath in a chapter from his

book, Teaching Needy Kids in our Backward System (ADI Press, 2007).
A special issue of Effective School Practices published in 1995-96 described Project Follow Through and its

implications for current generations of students.
Shepard Barbash describes the design and outcomes of Project Follow Through in his book Clear Teaching.

Staff of NIFDI's Department of Research and Evaluation have prepared a comprehensive ! bibliography of writing related to Direct Instruction and Project Follow Through.

Timeline of Direct Instruction Milestones

This timeline highlights many of the milestones in the history of Direct Instruction. It draw heavily from the chronology of Siegfried Engelmann's career as printed in *Engelmann's Direct Instruction: Selected Writings from the Past Half Century*.

1960s

1960–1964: Siegfried Engelmann worked in different advertising agencies and began analyzing techniques for marketing to children in order to determine what type of input was necessary to induce retention.

1963: Engelmann filmed his teaching sessions with his twin sons in order to demonstrate the effectiveness of his techniques and theories of instruction to education departments in various universities.

1964–1966: Engelmann began working with Carl Bereiter as a research associate for the Institute for Research on Exceptional Children, University of Illinois, Urbana-Champaign, Illinois.

1964: Creation of the Bereiter Engelmann preschool.

1966: *Give Your Child a Superior Mind* is published.

1966: *Teaching Disadvantaged Children in the Preschool* is published.

1968: Project Follow Through begins.

1969: First *DISTAR* instructional programs are released. Initially *DISTAR Reading* and *Language*.

1969: Engelmann-Becker Corp., Eugene, Oregon founded.

1969: *Preventing Failure in the Primary Grades* is published.

1970s

1970: Direct Instruction Follow Through Model moves to the University of Oregon.

1970: *DISTAR Arithmetic I* instructional program is published.

1974: Engelmann's first study using tactual vocoders with deaf subjects is published.

1975: *Your Child Can Succeed: How to Get the Most Out of School for Your Child* is published.

1975: *Corrective Reading* instructional program is published.

1975: First DI Conference is held, Eugene, Oregon.

1976: *Spelling Through Morphographs* instructional program is published.

1980s

1980: *Spelling Mastery* instructional program is published.

1981: *Corrective Mathematics* instructional program is published.

1982: *Theory of Instruction* is published.

1983: *Generalized Compliance Training: A Direct-Instruction program for managing severe behavior problems* is published.

1983: *Reading Mastery* instructional program is published (First revision of *DISTAR Reading*).

1983: *Teach Your Child to Read in 100 Easy Lessons* is published.

1984: Engelmann receives honorary doctorate degree from the Psychology Department of Western Michigan University.

1985: *Mastering Fractions* instructional program is published, the first in a series of videodisc programs.

1985: *Expressive Writing* instructional program is published.

1987: *Understanding Chemistry and Energy* instructional videodisc program is published.

1988: *Earth Science* instructional videodisc program is published.

1990s

1991: *Reasoning & Writing* instructional program is published.

1991: Engelmann sues the California State Board, Department of Education and Curriculum Commission for failure to follow administrative rules related to textbook adoptions.

1991: *Theory of Instruction* is revised and republished.

1992: *Connecting Math Concepts* instructional program is published.

1992: *War Against the Schools' Academic Child Abuse* is published.

1994: Engelmann receives American Psychological Association Fred Keller Award of Excellence.

1996: *Sponsor Findings from Project Follow Through* is published.

1996: *Research on Direct Instruction: 25 Years Beyond DISTAR* is published.

1997: National Institute for Direct Instruction (NIFDI) is founded with Engelmann as the director.

1997: *Horizons Learning to Read* instructional program is published.

2000s

2000: Zigsite.com is launched.

2000: Engelmann is named one of the 54 "most influential people" in the history of special education by Remedial and Special Education.

2000: *Journeys Direct Instruction Reading* program is published.

2001: *Funnix Beginning Reading* instructional program is published.

2001: *Español to English (Language for Learning)* instructional program is published.

2002: Engelmann receives the Council of Scientific Society Presidents 2002 Educational Research Award (Award of Achievement in Education Research).

2002: *Funnix Reading 2* instructional program is published.

2003: Engelmann retired, granted Professor Emeritus of Special Education, University of Oregon, Eugene, Oregon.

2004: *Inferred Functions of Performance and Learning* is published.

2007: *Teaching Needy Kids in Our Backward System: 42 Years of Trying* is published.

2008: *Socrates and Education: Bussing* is published on zigsite.com (first in Socrates series).

2008: *Reading Mastery Signature Edition* program is published.

2010s

2010: *Direct Instruction Spoken English (DISE)* instructional program is published.

2010: *Could John Stuart Mill Have Saved Our Schools?* is published.

2011: *Funnix Beginning Math* instructional program is published.

2014: *Connecting Math Concepts Comprehensive Edition* is published.